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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,316	06/23/2008	James E. Usowicz	W-389-02	2620

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EXAMINER	
JELLETT, MATTHEW WILLIAM	

ART UNIT	PAPER NUMBER
3753	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/598,316	USOWICZ ET AL.	
	Examiner	Art Unit	
	MATTHEW W. JELLETT	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 June 2008* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *08/24/2006 08/24/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statements filed 8/24/2006 and 8/24/2010 are acknowledged by the examiner.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a) because:

a. The drawings must show every feature of the invention specified in the claims:

i. **In regards to Claims** 1 & 12, the "first position…preventing the flow of fluid" as claimed must be shown or the feature(s) canceled from the claims(s). **No new matter should be entered.**

ii. **In regards to Claims** 3 & 14, the "conduit" as claimed must be shown or the feature(s) canceled from the claim(s). **No new matter should be entered.**

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. **Claims** 1 &12 are objected to because of the following informalities: In the body of the claim the phrase "said in rotor" appears to have a clerical error by including the word "in" which may make the claims indefinite if not removed. Appropriate correction is required.

5. **Claims** 3 & 14 are objected to because of the following informalities: The word "place" should be corrected to read "placed". Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

7. Claims 1- 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. **Claims** 1 & 12 each introduce the limitation "a stationary load bearing surface" twice in the body of the claim on various lines of the claim. It is not clear in later uses of the term which element is being referred to. Accordingly, there is insufficient/improper antecedent basis for the limitation in the claims, and the claims are indefinite.

b. **Regarding** claims 1 & 12, the word "means" is preceded by the word(s) "rotor fluid communication" and "stator fluid communication" in an attempt to use a "means" clause to recite a claim element as a means for performing a specified function. However, since no function is specified by the word(s) preceding "means," it is impossible to determine the equivalents of the element, as required by 35 U.S.C. 112, sixth paragraph. See *Ex parte Klumb*, 159 USPQ 694 (Bd. App. 1967). A review of the specification also shows that the rotor fluid communication means is a channel, and that the stator fluid communication means is in the form of two openings in the stationary load bearing surface of the stator. Accordingly, in furtherance of compact prosecution, the terms will be interpreted as such.

c. **Regarding** claim 8, the phrase "selected from" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are claimed in the alternative or part of a group as a whole with the grouping open ended. See MPEP § 2173.05(h). The phrase will be interpreted as "selected from a group consisting of" in furtherance of compact prosecution.

d. **In regards to Claims** 11 and 22 the claims are rejected for the following reasons: a broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by narrow language. The Board stated that this can

render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claims 11 and 22 each recite the broad recitation "at least one of said rotor and stator is comprised of stainless steel, titanium and aluminum", and the claim also recites "said rotor and stator comprised of stainless steel, titanium and aluminum" which is the narrower statement of the range/limitation.

e. **Claims** 11 and 22 are further rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Claims recite: "at least one of said rotor and stator is comprised of stainless steel, titanium and aluminum and at least one of said rotor and stator is comprised of polyetheretherketone and tetrafluoroethelene and combinations of polyetheretherketone and tetrafluoroethelene". It is not clear what is being claimed from this recitation, if one of the components is "stainless steel, titanium and aluminum" it naturally follows that the other can be the same or "polyetheretherketone and tetrafluoroethelene and combinations of polyetheretherketone and tetrafluoroethelene", but neither component can be both at the same time. Accordingly, the recitation should be corrected to read: "at least one of said rotor and stator is comprised of stainless steel, titanium and aluminum and the other of said at least

one of said rotor and stator is comprised of polyetheretherketone and tetrafluoroethelene and combinations of polyetheretherketone and tetrafluoroethelene"

f. **Claims** 2 & 13 each introduce the limitation "and a means for holding" in the body of the claim when "means for holding" was previously introduced in the parent claim above. It is not clear in later uses of the term which element is being referred to. Accordingly, there is insufficient/improper antecedent basis for the limitation in the claims, and the claims are indefinite. Appropriate correction is required.

g. **Claim** 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "As in claim 1 but with more than 2 positions" without properly referring to a limitation in the preceding claim, and with out properly referring to what in the preceding claims has more than "2 positions". Accordingly the claim is indefinite for at least these reasons.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 2, 3, 4, 5, 8, 12, 13, 14, 15, 16, 19, and 23, as far as they are definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over *Nichols* (US 6453946) in view of *Welty* (US 6904935).

10. *Nichols* anticipates the device and in the alternative provides a device capable of performing the method steps of controlling flow of fluid, as can be seen in Figs. 1 and 2 below:

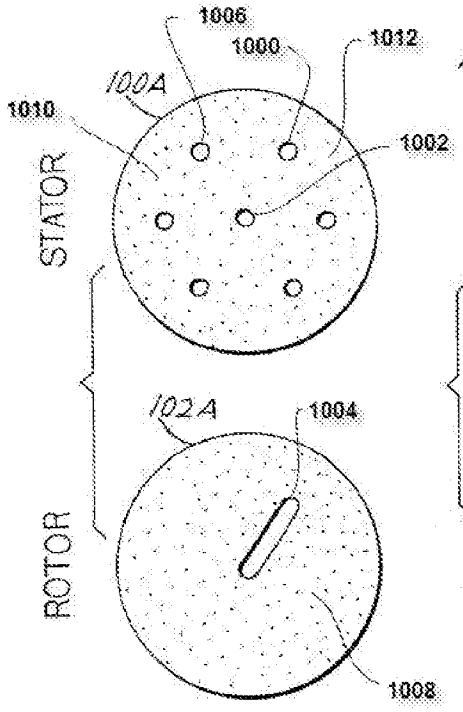

FIG. 1

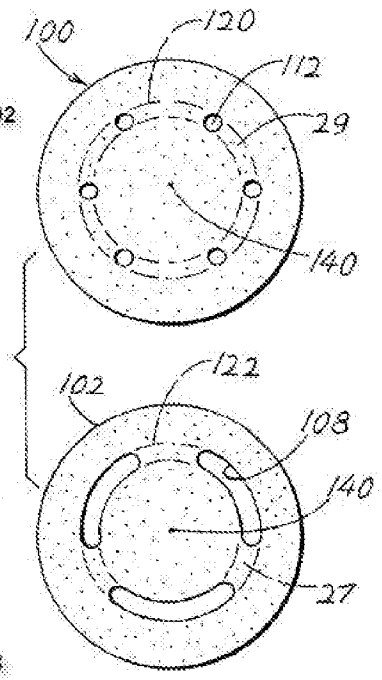

FIG. 2

A device for controlling the flow of fluid comprising (Fig. 1): a rotor (102A) having a rotor fluid communication means (1004 Fig. 1) and at least one rotor load bearing surface (1008) which rotor load bearing surface sealably engages a stationary load bearing surface (Col 5 lines 45 – 50), said rotor capable of assuming a first position and a second position by rotation (Col 1 lines 16 – 25 where the rotor rotates to select the passages on the stator); at least one stator (100A Fig. 1) having a stationary load bearing surface (1010 Fig. 1) having stator fluid communication means (passages located on the stator Fig. 1), said stationary load bearing surface sealably

engaging said rotor load bearing surface and permitting rotation of said rotor with respect to said stator (Col 5 lines 45 – 50), wherein in said first position said rotor fluid communication means and said stator fluid communication means prevent the flow of fluid (1004 may be aligned with position 1012 and stator opening 1002 to prevent the flow of fluid Fig. 1) and in said second position said rotor fluid communication and stator fluid communication means permits the flow of fluid (1004 may be aligned with stator communication means 1000 and 1002 to allow the flow of fluid between 1000 and 1002); at least one of said rotor bearing surface and said stator load bearing surface having a diamond like carbon coating (162 Fig. 7, tungsten carbide/carbon is a form of diamond like carbon); compression means for holding said at least one stator and rotor with said in rotor load bearing surface and stationary load bearing surface sealably engaged (the device requires a clamping means to exceed the high pressure, for example 5000 psi (see Col 1 lines 65-67, Col 2 lines 23 – 35), it is well known in the art to use a housing or other clamping means to hold the rotor and stator together under high levers of pressure. The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. "The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." In re Napier, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also In re Grasselli, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983). *Nichols* clearly anticipates the clamping means because *Nichols* must have a means such as a housing to hold the rotor and stator together under high levels of compressive forces (i.e. 5000 psi or greater)), and said diamond carbon coating providing a low friction and increased hardness allowing repeated movement between said first

and second positions (Col 1 lines 45-50). *Nichols* does not disclose or teach a diamond like carbon coating with silicon (silica). *Welty* (US 6904935) does teach the use of a diamond carbon type silica coating (See Col 4 lines 40 – 40), where the use of a ceramic such as silicon carbide can be the base material, or where use of silicon can be used as an adhesion promoting layer. It would have been obvious to one of ordinary skill at the time of the invention to modify the device utilizing the diamond like carbon layer of *Nichols* as the bearing layer, and to bind the bearing layer to the base layer utilizing the silicon materials as provided in *Welty,* so that as discussed in *Welty,* the bearing layer adhesion to the substrate of for example the stator may be improved.

11. **In regards to Claims 2 and 13** *Nichols* anticipates**:** a housing for the reasons as discussed above regarding the clamping means, because *Nichols* must have a means well known in the art such as a housing to hold the rotor and stator together under high levels of compressive forces (i.e. 5000 psi or greater).

12. **In regards to Claims** 3 and 14 *Nichols* anticipates: The device of claim 1 wherein said stator fluid communication means is at least one stator opening (1000 Fig. 1) in said stator, said at least one stator opening for being place in fluid communication with a conduit (1004 Fig. 1, acts as a conduit to convey fluid between 1000 and 1002 when arranged to connect the two openings).

13. **In regards to Claims** 4 and 15 *Nichols* anticipates: The device of claim 1 wherein said rotor fluid communication means comprises at least one opening (1004 acts as an opening to channel fluid from 1002 to for example 1006 or vice versa).

14. **In regards to Claims** 5 and 16 *Nichols* anticipates: The device of claim 3 wherein said rotor fluid communication means comprises a channel for placing two or more stator openings in fluid communication (1004 Fig. 1).

15. **In regards to Claims** 8 and 19 *Nichols* anticipates: The device of claim 1 wherein at least one of said rotor and stator is comprised of a material selected from polyetheretherketone, tetrafluoroethelene, combinations of polyetheretherketone and tetrafluoroethelene, stainless steel, titanium and aluminum (Col 5 lines 1 - 5).

16. **In regards to Claim** 23, as far as it is definite, *Nichols* further anticipates: [the device] with more than 2 positions (See Fig 1 where 1004 can be rotated to meet additional openings on the stator).

17. Claims 6, 7, 17, and 18 are rejected as far as they are definite under 35 U.S.C. 103(a) as being unpatentable over *Nichols* in view of *Welty,* as applied to claims above, and further in view of *Doll* (US 2006/0257663).

2. *Nichols modified above* does not disclose the diamond like carbon – silica coating with the proportions that fall within the range as seen in Claim 6. But, *Doll* does teach an embodiment that falls within the ranges of the diamond-like carbon-silica coating being 40-90% carbon, 20-40% hydrogen and 0.0 to 5% silica carbon (See abstract). It would have been obvious to one of ordinary skill at the time of the invention to further modify the device by utilizing the rotor and stator as provided in *Nichols* to include proportions of carbon, hydrogen, and silicon as seen in *Doll* as a matter of engineering expedient to provide the hard / wear resistant diamond

like carbon / glass and amorphous coating so as to reduce adhesion between the surfaces of the rotor and the stator.

18. **In regards to Claims** 7 and 18 *Nichols* further anticipates: the diamond like carbon-silica coating is a DLC coating (Col 4 lines 42 - 45, it is commonly know in the art that Tungsten Carbide/Carbon (WC/C) composition is a diamond like carbon material.)

19. Claims 9-11 and 20-22 are rejected as far as they are definite under 35 U.S.C. 103(a) as being unpatentable over *Nichols* in view of *Welty,* as applied to claims above, and further in view of *Ahlgren* (US 6719001).

3. *Nichols* modified above, further anticipates the use of stainless steel (Col 2 lines 20-25) and titanium (Col 5 lines 30 - 35) as materials for the rotor or stator, but does not disclose the use of polyetheretherketone or aluminum for the rotor and/or stator. But *Ahlgren* does teach the use of polyetheretherketone and/or aluminum as one of the materials for construction of a rotary valve (Col 6 lines 25-60). *Ahlgren* also teaches the use of stainless steel, titanium, and tetrafluoroethylene as materials for construction of a rotary valve (Col 6 lines 25-60).

20. Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the combination the materials of stainless steel and titanium, as provided in *Nichols* for the construction of the rotor or stator, in combination with the material of aluminum as seen in *Ahlgren* . Furthermore, it would have been obvious at the time of the invention for one of ordinary skill in the art to further modify utilizing the material of tetrafluoroethelene as provided in *Nichols* to combine it with the material of polyetheretherketone as utilized in *Ahlgren* to construct the stator or rotor portions of the rotary valve, as also shown in *Ahlgren.* Accordingly, either one or both the rotor or the stator could be

constructed of polyetheretherketone and tetrafluoroethelene and/or combinations thereof, and either one or both the rotor or stator could be constructed of stainless steel, titanium and aluminum. In doing so, the stator or rotor would as mentioned in *Ahlgren* (Col 6 lines 25-60) be strongly resistant to abrasion and chemically compatible with components of the fluid itself.

21. **Furthermore, with reference specifically to Claims 9, 10, 20, and 21** it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the device of Nichols by utilizing a combination of polyetheretherketone and tetrafluoroethelene as taught by Ahlgren, where it would have been a matter of engineering expedient to utilize a percentage of 50 to 90 percent polyetheretherketone and a percentage of 10 to 50 percent tetrafluoroethelene or utilize a percentage of 60 to 80 percent polyetheretherketone and a percentage of 20 to 40 percent tetrafluoroethelene, so as to attenuate the levels of hardness and roughly match the corresponding desired fluid pressure range for the particular system.

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ogle (US 4444066) discloses a high pressure sample injector valve utilizing a housing to contain the stator and rotor components. Nichols (US 6012488) discloses a segmenting valve with a stator and rotor maintained within a chamber. Non patent literature, Nano Structured Coatings, Cavaleiro and De Hosson, 2006 Springer Scient + Business Media, LLC, Pg 162-163 Micro Structures of Diamond Like Carbon Multilayers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW W. JELLETT whose telephone number is (571)270-7497. The examiner can normally be reached on Monday - Friday 8:30 am - 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Hepperle can be reached on (571) 272-4913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. W. J./
Examiner, Art Unit 3753

/John K. Fristoe Jr./
Primary Examiner, Art Unit 3753